Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Fifth Semester

CIVIL ENGINEERING

U18CET5005**:** Concrete Technology

Use of *IS 10262-2019* and *IS 456-2000* are permitted

CO1: Understand the properties of various ingredients of concrete.
CO2: Select suitable admixture for concrete with special properties.
CO3: Design the concrete mix for the required strength as per BIS guidelines.
CO4: Understand tests for fresh and hardened properties of concrete.
CO5: Understand special type of concrete for the given requirement.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	What is the role of gypsum in cement? Why is gypsum inter ground with clinkers?	CO1	[K_2]
2.	Describe the effects of sea water in concrete.	CO1	[K2]
3.	What is super plasticizer and why is it used in concrete?	CO2	[K_2]
4.	Outline the role of air entraining admixtures.	CO2	[K_2]
5.	What is nominal mix and design mix of concrete?	CO3	[K_2]
6.	List the variable factors to be considered in the proportioning of concrete mix.	CO3	[K_2]
7.	Differentiate between segregation and bleeding.	CO4	[K_2]
8.	What is the relationship between flexural strength and compressive strength of concrete as per IS 456?	CO4	[K_2]
9.	Define light weight concrete and ferro cement.	CO5	[K_2]
10.	Distinguish between high strength and high-performance concrete.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	What are Bogue's compounds? Explain in detail how each one of these compounds influences the strength and setting properties of cement.	CO1	[K_2]
	b)	Write in detail about the classification of aggregates based on geological origin, size and shape.	CO1	[K_2]
12.	a)	What is chemical admixture? Suggest a suitable admixture for concreting to be done during the month of December in Kashmir and during the month of May in Chennai. Describe the role of the admixture you suggest in detail.	CO2	[K_2]
	b)	What are mineral admixtures? List the commonly used mineral admixtures in	CO2	[K_2]

concrete and explain any two of them in detail, how it acts in concrete in fresh and hardened state.

13. Design a concrete mix of M 20 grade as per IS:10262-2009, concrete mix proportioning-guidelines for the data given below. CO3 [K_3]

i. Grade designation : M 20
ii. Type of cement : OPC 43 grade confirming to IS 8112
iii. Maximum nominal size of aggregates : 20 mm
iv. Minimum cement content : 320 kg/m^3
v. Maximum water cement ratio : 0.55
vi. Workability : 75 mm (slump)
vii. Exposure condition : Mild
viii. Degree of supervision : Good
ix. Type of aggregate : Crushed angular aggregate
x. Maximum cement content : 450 kg/m^3
xi. Chemical admixture : Not recommended
xii. Specific gravity of cement : 3.15
Coarse aggregate : 2.68
Fine aggregate : 2.65
xiii. Water absorption
Coarse aggregate : 0.6 percent
Fine aggregate : 1.0 percent
xiv. Free (surface) moisture
Coarse aggregate : Nil (absorbed moisture full)
Fine aggregate : Nil
xv. Sieve analysis
Coarse aggregate : Conforming to Table 2 of IS: 383
Fine aggregate : Conforming to Zone I of IS: 383

14. a) What are the different laboratory test used to assess the workability of concrete? Explain any two of the tests in detail. CO4 [K_2]

b) Explain in detail, how to assess the properties of hardened concrete in the laboratory. CO4 [K_2]

15. a) What is Geopolymer concrete? Explain the advantages and uses of it. Also, explain in detail about self-compacting concrete with suitable example. CO5 [K_2]

b) What are various factors affecting properties of fibre reinforced concrete? List the applications of fibre reinforced concrete. CO5 [K_2]

16. Elaborate the test procedures to determine the following tests on cement. CO1 [K_2]

i. Soundness of cement
ii. Fineness of cement
iii. Consistency of cement
iv. Initial and final setting time of cement

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